

REMARKS/ARGUMENTS

During the interview the below signed attorney noted that the finality of the office action is premature since the examiner has raised new grounds for rejecting the claims which were not necessitated by applicant's previous amendment. Accordingly, applicant submits that the finality of the office action should be withdrawn. However, it is to be noted that this is most likely a moot point in view of the examiner's indication during the interview that the present amendment should result in allowance of the application.

The examiner has objected to claims 1, 4, 5, 7, 8, 10 and 12 in item 7 of the office action and has raised various grounds for rejecting the claims in items 9, 11, 12 and 13 of the office action. Before discussing the various issues raised by the examiner in the aforementioned objections and rejections, the below signed attorney first wishes to thank the examiner for the courtesy extended to the below signed attorney during the interview on October 27, 2003. The following remarks constitute a separate summary of the substance of the interview as well as additional comments in support of the patentability of the claimed invention.

It was emphasized by the below signed attorney during the interview that applicant's invention pertains to improved reinforcing and processing fibers which are useful in the fabrication of friction linings and gaskets. The fibers of the invention are vegetable fibers (i.e., fibers obtained from vegetation such as flax, hemp, sisal, jute or ramie). The improvement relates to the treatment of the fibers to obtain a high degree of fibrillation so that the fibers of the invention (either reinforcing fibers or process fibers) can substitute for fibrillated aramid fibers in many applications (see page 3; lines 9-11).

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It was noted during the interview that the vegetable fibers which are improved in accordance with the present invention include "bast fibers" which are composed of fibers in which plural elementary fibers are combined into fiber bundles (see page 1, lines 9-13). It is these elementary fibers of the bundles which are fibrillated. In this regard it is noted on page 1, beginning on line 13 that fibrillation is a process where the elementary fibers are split open into finer fibers which are known as "fibrils". The degree of fibrillation of the elementary fibers is related to the number of fibrils which are formed along the length of the elementary fiber. It is noted on page 9, lines 14-16 that "the degree of fibrillation indicates which fraction of the length of an elementary fiber has fibrils". A method for determining the degree of fibrillation, measured in percentage, is described in the paragraph on page 9 under the heading "Degree of Fibrillation". It is self-evident from this description that the portion of an elementary fiber which has fibrils extending therefrom can vary from 100% to a content or fraction thereof which is less than 100%. Other measurements of the content or fraction of the fibrils are described in the specification. In particular, it is noted in the paragraphs which appear under the heading "Fractions of Fibrils" on page 9 of the specification that the measurement of the fibril fraction provides an accurate method for determining the amount of fibrillation of an elementary fiber. This portion of the specification describes the measurement of fibril fraction which is expressed in units of area percent. The degree of fibrillation expressed in the claims is given in units of "area percent".

X In view of the above, it is clear that applicant's invention pertains to vegetable fibers which have been fibrillated to produce a high number of fibrils along the length of the elementary fibers. In claim 1 the high degree of fibrillation is recited as being greater than 3 area percent and less than 50 area percent.

high degree of fibrillation



Thus, it is the level of fibrillation of the claimed fibers which is important in the present invention.

Turning now to the issues raised by the examiner, the examiner has objected to claims 1, 4, 5, 7, 8, 10 and 12 in item 7 on the grounds that the claims are grammatically incorrect and confusing. During the interview the examiner indicated that the confusion from the claims arises from the use of the term "content" in the claims to describe the above-described high degree of fibrillation which characterizes the present invention. The examiner agreed that changing "fibril content" to "fibril fraction" will overcome this objection. Accordingly, applicant has amended the claims by replacing the term "fibril content" with "fibril fraction". However, applicant submits that the original term "fibril content" implicitly refers to the fibril fraction since the term "content" as used in the context of applicant's invention clearly refers to the part or fraction of the elementary fibers which have fibrils and thus the term "fibril fraction" as currently recited in the claims merely clarifies that which was clearly implicit in the original wording.

The examiner agreed during the interview that the above-discussed amendment will result in withdrawal of the objection to the claims.

The examiner has rejected claims 4 and 5 under 35 U.S.C. § 112, second paragraph, as being indefinite. In this regard the examiner urges that claims 4 and 5 are unclear because it is not clear whether or not the fibers recited in the claims refer to vegetable fibers or the aramid fibers. Applicant has amended claims 4 and 5 to make it clear that the fibers being referred to are the vegetable fibers. In this regard it is to be noted that claims 4 and 5 originally recited that the fibers are the fibers according to "claims 1 or 2" which are indeed the vegetable

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fibers. Furthermore, it is clear from the specification that the fibers of the invention pertain to vegetable fibers and in this regard it is noted on page 3, lines 23-26 that the limitations referred to in claims 4 and 5 refer to the fibers of the invention (i.e., the vegetable fibers).

It was also agreed during the interview that the term "comprising" in claim 1 and in some of the other claims should be changed to "wherein". Accordingly the term "comprising" has been replaced by "wherein" in claims 1, 2, 4, 5, 7, 8, 10, and 17.

In addition to the above-discussed substitution of "wherein" for "comprising" applicant has made a few additional minor changes in the wording of the claims to further improve their language.

The examiner has rejected claims 1-5, 11, 13 and 17-18 under 35 U.S.C. § 103(a) as being unpatentable over Ikuta. In rejecting the claims the examiner acknowledges that Ikuta does not disclose that the fibers have a fibril content greater than 3 area percent and less than 50 area percent. However, the examiner urges that since 5-70% of the fiber is fibrillated, it would follow that 3-50 area percent would be included in Ikuta's range. Also the examiner further notes that the fibril content increases the wear resistance and it would be obvious for one skilled in the art to use the recited fibril content in order to increase the wear resistance of the fiber mixture. Applicant has carefully considered this rejection but it is most respectfully traversed for the reasons discussed below.

As noted during the interview, the present invention relates to the degree of fibrillation of the elementary fibers. Ikuta is silent on the degree of fibrillation. Instead, Ikuta is only concerned with paper-like friction material which is *fric*

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characterized by the amount of fibrillated fiber contained therein. In particular, Ikuta states in column 1, lines 30-33 that his paper-like friction material is characterized by containing 5 to 70 weight percent of fibrillated ramie fibers with a freeness of 400 to 700 ml. Ikuta makes absolutely no disclosure regarding the degree of fibrillation utilized in the fibrillated ramie fibers which he includes in his paper-like friction material. The fact that Ikuta uses 5-70% of the fibrillated ramie fibers in his paper provides absolutely no disclosure or teaching regarding the degree of fibrillation of his fibrillated fibers.

The examiner agreed with this analysis during the interview and indicated that Ikuta does not disclose or suggest vegetable fibers having the high degree of fibrillation required by applicant's invention.

It was also emphasized by the below signed attorney during the interview that not only does Ikuta fail to disclose or suggest highly fibrillated vegetable fiber, he teaches against the fibers of the present invention. In this regard it was emphasized that contrary to the examiner's observation, Ikuta does not teach that the wear resistance can be improved by a higher fibril content. Instead, Ikuta states that the wear resistance is improved by a fibrillated ramie fibers with a freeness of 400 to 700 ml (see column 1, lines 32-33). In the papermaking industry, the freeness of the pulp is an important characteristic since it is critical to the drainage properties on the paper machine. The pulp freeness is the rate at which water will drain through the pulp. See attached abstracts of *Ullmann's Encyclopedia of Industrial Chemistry*; and "Refining and Pulp Characterization" published in the internet at www.wmich.edu/ppse/pekarovicova/210999a.html). In North America the freeness is usually the Canadian Standard Freeness (CSF).

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In the papermaking process the plant fibers are stripped from their non-cellulosic associates. This is usually done by chemical or biological degradation. Then the fibers are cut in order to reduce the fiber length. Further, the fibers are swelled by watering them and decurled. Finally the fibers may be fibrillated and fines may be produced. The surface of the fiber is initially relatively smooth. The beading of the fibers causes bits of the fiber surface to come loose, increasingly giving the surface the appearance of having grown hairs. These hairy surface outcroppings are called fibrils, and the manner of their occurrence is described as fibrillation. If the beading action is sufficiently severe or prolonged, the surface fibrils can be totally dislodged from the fiber, becoming very small particles which are free to wander around. These separated fibrils are called fines. It is the fibrillated surface of the fibers and the Independent fines which are largely responsible for the drainage characteristics of the stock of the paper makers mold or on the wire of a paper machine. The more fibrillation and the more fines are produced, the slower water will pass through the forming mat. **This means that the more the fibril the content is (i.e., the more the fibers are fibrillated) and the more fines are present, the lower the freeness will be.** This is clearly evident from the attached publication "Science for Handpapermakers" by W.F. Cowan, published at www.sewanee.edu/Chem&Art/Detail_Pages/Paper/Science_for_vol2.htm

Ikuta clearly teaches that the **value of freeness shall be high** (see column 1, line 43). This means that the degree of fibrillation of the ramie fibers utilized by Ikuta must be kept low, not high as in applicant's invention. Thus it is self-evident that Ikuta clearly teaches away from the present invention because the present invention requires highly fibrillated fibers (see page 3, line 9 of applicant's specification) whereas Ikuta requires fibers with a high freeness value which is associated with a low fibril content. Accordingly, there would be no motivation for

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one skilled in the art to ignore Ikuta's requirements for high values of freeness (low degrees of fibrillation) to produce a highly fibrillated fiber wherein the freeness value will be lowered.

In view of the above, it is clear that Ikuta does not disclose or suggest the highly fibrillated fibers of applicant's invention. Thus, the rejection of the claims under 35 U.S.C. § 103(a) as being unpatentable over Ikuta must be withdrawn.

The examiner has rejected claims 1, 6-8 and 19-20 under 35 U.S.C. § 103(a) as being unpatentable over Ikuta in view of Kolla et al. In rejecting the claims the examiner has relied upon Ikuta for the same reasons noted in the above-discussed rejection. In rejecting the claims the examiner acknowledges that Ikuta does not disclose a mixture of vegetable fibers and shives. The examiner turns to the teaching of Kolla for this aspect of the invention. Applicant submits that modifying Ikuta by the inclusion of shives will not result in the claimed invention in view of the shortcomings of Ikuta discussed above.

The examiner has rejected claims 1, 9-10 and 12 under 35 U.S.C. § 103(a) as being unpatentable over Ikuta in view of Holinski. The examiner relies upon Ikuta for the same reasons discussed above and urges that it would be obvious to arrive at the claimed invention by including the metal sulphides disclosed by Holinski. Applicant submits that this rejection should also be withdrawn since it is clear from the above discussion of Ikuta that incorporation of the metal sulphides with the fibers of Ikuta will not result in applicant's invention in view of the shortcomings of Ikuta.